



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

AUG 28 1989

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Standard Environmental Hazard  
Assessment for PMN P89-0867

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A. Executive Summary

The PMN substance [REDACTED] [REDACTED] a large molecular weight ( [REDACTED] ) and a high melting solid [REDACTED] °C) with a log P value of [REDACTED]. This compound is considered a super lipophilic compound with no toxicological groups present and is expected to exhibit solely narcosis type toxicity. However, because of the high MW, large cross-sectional diameter and log P this compound is not expected to bioconcentrate or show toxicity to aquatic organisms. The manufacturer did not submit environmental toxicity data on the PMN substance.

The expected environmental photodegradation products, lesser brominated phenolic substitution derivatives of the PMN, are expected to bioconcentrate and show chronic toxicity to aquatic organisms. The aquatic chronic toxicity concern for the degradation products is based upon quantitative structure activity relationships (QSARs). All of the predicted acute toxicity values greatly exceed the water solubility and therefore

toxicity is not expected to be achieved during acute exposures.

Based upon this hazard assessment, the predicted concern concentration recommended for risk assessment is 0.1 ppb. The green algal, fish and daphnid chronic values (NEC or GMATC) are all  $\leq$  0.1ppm.

#### B. Aquatic Toxicity

The PMN is not expected to bioconcentrate to an appreciable extent in fish due to its physical and chemical properties. The large MW of the PMN substance ( ) is an indication of low bioconcentration. It has been suggested that uptake of neutral organic chemicals decreases exponentially with increasing MW (Zitko 1981) and that chemicals with MWs greater than 600 are poorly absorbed through respiratory membranes. Poor bioconcentration potential is suggested because of its large cross-sectional diameter based upon the suggestion of Opperhuizen et al. (1985) that 9.5 angstroms represents the upper limit of a molecule's smallest cross-sectional van der Waals diameter for transport of neutral organic chemicals through respiratory membranes. Opperhuizen et al. demonstrated that compounds not bioconcentrated through fish gills had diameter of  $> 9.5$  angstroms; for example, while hexachlorobenzene (8.7 A) was accumulated, hexabromobenzene (9.6 A) was not bioconcentrated. The cross-sectional diameter of the PMN substance is believed to be equal or greater than 9.5 A.

The chronic toxicity values of the photolysis products in water with one to four hydroxyl groups present vary from 1.9 ppt (parts-per-trillion) to 0.072 ppm presented in Table 1. The most likely environmental photolysis product of the PMN is with only substitution of two hydroxyl groups (Leifer Chemical Assessment Branch/Exposure Evaluation Division). This compound is predicted to have a fish 14-day value of 0.48 ppb. The daphnid predicted chronic value for this same degradation product is predicted to be 0.19 ppb. Bioconcentration is expected to a greater extent for the three to four hydroxyl groups substitution photolysis products and therefore are of highest concern.


#### C. Concern Level

The chronic values for daphnids, fish and algae have been estimated for the expected PMN photolysis products in water. A fish chronic value of  $<1$  ppb has been predicted for the PMN photolysis with three hydroxyl groups substitution. Applying an assessment factor of 10 to the predicted fish chronic value (USEPA, 1984), the Environmental Effects Branch (EEB) expresses concern for the PMN substance where concentrations in aquatic environments equal or exceed 0.1 ppb.

#### D. Recommended Testing

The recommended testing for the photolysis products of PMN 89-0867 is the algal toxicity test, the fish early life stage test, the daphnid chronic toxicity test and a fish bioconcentration test. No acute toxicity tests are recommended.

Table 1. SAR Analysis of the products of photolysis of PMN-890867 in water using the neutral organic SARs (Clements et al. 1988). Kow values were calculated using CLOGP 3.3. All toxicity values are in mg/L (ppm).

No. OH Present	MW	Log P	Fish 14Dy LC50	Fish Chronic Value	Daphnid 16Dy EC50	Algal 96-h	Algal Chronic Value
1			$6.9 \times 10^{-5}$	$5.0 \times 10^{-6}$	$3.8 \times 10^{-5}$	$7.4 \times 10^{-6}$	$1.9 \times 10^{-6}$
2			$4.8 \times 10^{-4}$	$3.5 \times 10^{-5}$	$1.9 \times 10^{-4}$	$5.7 \times 10^{-5}$	$1.4 \times 10^{-5}$
3			0.006	<0.001	0.001	$8.0 \times 10^{-4}$	$2.0 \times 10^{-4}$
4			0.072	0.005	0.011	0.011	0.003

## References

Leifer, A. 1989. Personal communication.

Clements, R. G. 1988. Estimating toxicity of industrial chemicals to aquatic organisms using structure activity relationships. Washington, DC: U. S. Environmental Protection Agency, Office of Toxic Substances, Health and Environmental Review Division, Environmental Effects Branch. 200460-001/EPA-560-6-88-001. Available from NTIS, Springfield, Va. 22161, PB89-117592/AS.

Oppenhuizen, A., E. W. Von der Velde, F. Gobas, D. A. K. Liem, J. M. D. Von der Steen. and O. Hutzinger. 1985. Relationship between bioconcentration in fish and steric factors of hydrophobic chemicals. Chemosphere 14: 1871-1896.

United States Environmental Protection Agency (USEPA). 1984. Estimating "concern level" for concentrations of chemical substances in the environment. Unpublished manuscript. Washington, DC: Environmental Effects Branch, Health and Environmental Review Division, Office of Toxic Substances, USEPA.

Zitko V. 1981. Uptake and excretion of chemicals by aquatic fauna. pp 67-78 IN Stokes PM (ed). Ecotoxicology and the Aquatic Environment. New York, NY: Pergamon Press.